

WHAT IS CLAIMED IS:

1. A multiparameter high precision concurrent estimation method in image subpixel matching in which in an N-dimensional similarity space where N (N is an integer of four or greater) correspondence parameters between images are axes, said N correspondence parameters between images are estimated precisely and concurrently by using an N-dimensional similarity value between images obtained at discrete positions, comprising the steps of:

determining a sub-sampling position where said N-dimensional similarity value between images is maximum or minimum on a line in parallel with a certain parameter axis, and determining an N-dimensional hyperplane that most approximates determined said sub-sampling position;

determining N of said N-dimensional hyperplanes with respect to each parameter axis;

determining an intersection point of N of said N-dimensional hyperplanes; and

setting said intersection point as a sub-sampling grid estimation position for said correspondence parameter between images that gives a maximum value or a minimum value of N-dimensional similarity in said N-dimensional similarity space.

2. A three-parameter high precision concurrent estimation method in image subpixel matching in which in a three-dimensional similarity space where three correspondence parameters between images are axes, said three correspondence parameters between images are estimated precisely and concurrently by using a three-dimensional similarity value between images obtained at discrete positions, comprising the steps of:

determining a sub-sampling position where said three-dimensional similarity value between images is maximum or minimum on a line in parallel with a certain parameter axis, and determining a plane that most approximates determined said sub-sampling position;

determining three of said planes with respect to each parameter axis;

determining an intersection point of three of said planes; and

setting said intersection point as a sub-sampling grid estimation position for said correspondence parameter between images that gives a maximum value or a minimum value of three-dimensional similarity in said three-dimensional similarity space.

3. A two-parameter high precision concurrent estimation method in image subpixel matching in which a position of a

maximum value or a minimum value of a two-dimensional similarity in a continuous area is estimated precisely by using a two-dimensional similarity value between images obtained discretely,

comprising the steps of:

determining a sub-sampling position where said two-dimensional similarity value between images is maximum or minimum on a line in parallel with a horizontal axis, and determining a line (horizontal extreme value line HEL) that most approximates determined said sub-sampling position;

determining a sub-sampling position where said two-dimensional similarity value between images is maximum or minimum on a line in parallel with a vertical axis, and determining a line (vertical extreme value line VEL) that most approximates determined said sub-sampling position;

determining an intersection point of said horizontal extreme value line HEL and said vertical extreme value line VEL; and

setting said intersection point as a subpixel estimation position that gives a maximum value or a minimum value of said two-dimensional similarity.

4. A multiparameter high precision concurrent estimation program in image subpixel matching in which in an N-dimensional similarity space where N (N is an integer of four or greater)

correspondence parameters between images are axes, said N correspondence parameters between images are estimated precisely and concurrently by using an N-dimensional similarity value between images obtained at discrete positions, said program is executable with a computer, comprising the functions of:

determining a sub-sampling position where said N-dimensional similarity value between images is maximum or minimum on a line in parallel with a certain parameter axis, and determining an N-dimensional hyperplane that most approximates determined said sub-sampling position;

determining N of said N-dimensional hyperplanes with respect to each parameter axis;

determining an intersection point of N of said N-dimensional hyperplanes; and

setting said intersection point as a sub-sampling grid estimation position for said correspondence parameter between images that gives a maximum value or a minimum value of N-dimensional similarity in said N-dimensional similarity space.

5. A three-parameter high precision concurrent estimation program in image subpixel matching in which in a three-dimensional similarity space where three correspondence parameters between images are axes, said three correspondence

parameters between images are estimated precisely and concurrently by using a three-dimensional similarity value between images obtained at discrete positions, said program is executable with a computer, comprising the functions of:

- determining a sub-sampling position where said three-dimensional similarity value between images is maximum or minimum on a line in parallel with a certain parameter axis, and determining a plane that most approximates determined said sub-sampling position;

- determining three of said planes with respect to each parameter axis;

- determining an intersection point of three of said planes; and

- setting said intersection point as a sub-sampling grid estimation position for said correspondence parameter between images that gives a maximum value or a minimum value of three-dimensional similarity in said three-dimensional similarity space.

6. A two-parameter high precision concurrent estimation program in image subpixel matching in which a position of a maximum value or a minimum value of a two-dimensional similarity in a continuous area is estimated precisely by using a two-dimensional similarity value between images obtained

discretely,

said program is executable with a computer, comprising the functions of:

determining a sub-sampling position where said two-dimensional similarity value between images is maximum or minimum on a line in parallel with a horizontal axis, and determining a line (horizontal extreme value line HEL) that most approximates determined said sub-sampling position;

determining a sub-sampling position where said two-dimensional similarity value between images is maximum or minimum on a line in parallel with a vertical axis, and determining a line (vertical extreme value line VEL) that most approximates determined said sub-sampling position;

determining an intersection point of said horizontal extreme value line HEL and said vertical extreme value line VEL; and

setting said intersection point as a subpixel estimation position that gives a maximum value or a minimum value of said two-dimensional similarity.